

Experience of Pediatric Patients with Mini-Implants undergoing Orthodontic Treatment

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Abstract:

Background: Mini-implants are gaining achievement in orthodontics procedures as they provide maximum anchorage. The study was planned to evaluate different experiences with mini-implants among pediatric patients.

Materials and Methods: This study was done among 86 patients with a mean age of 14±23 years. All the participants were interviewed with the help of a questionnaire containing information as experience during treatment with mini-implants, acceptance rate of mini-implants, complications faced during procedure and satisfactory results with the treatment. Visual analog scale (VAS) was used to record pain parameters. The data were analyzed by SPSS 16.0 software. Nonparametric test was applied to obtain the median of VAS scores.

Results: Most of the patients face problems with mini-implants during mastication of food (28.2%) and speech (23.6%). It also leads to poor oral hygiene in 16.4% of the subjects. The highest VAS scores were traced from the period of one to 20 h, i.e. (33.7-40.2). It was observed that most of the subjects get adapted to the mini-implants in 5-10 days.

Conclusions: It is safe and sound to use mini-implants as an orthodontic anchorage device among patients undergoing orthodontic treatment. Mini-implants are unquestionably accessory tools for treatment of orthodontists and ought to be utilized in selected cases demanding greatest anchorage.

Key Words: Mini-implants, orthodontics, pediatric patients

Introduction

Orthodontic procedure is recommended for esthetics and proper functioning of teeth. Patients look for orthodontic treatment mainly for esthetic motives, but orthodontists normally advise orthodontic treatment to patients for function purposes.¹

Orthodontic treatment takes a longer duration in the alignment of dentition that leads to dissatisfaction among the patients. Hence, numbers of techniques have been introduced to assist in the reduction of duration of the treatment.² Temporary anchorage devices (TADs) and surgical corticotomies have been discovered for lesser duration treatment. Reducing the period of treatment with effective techniques, increases the acceptability among patients to accept the orthodontic procedure.^{3,4}

The usage of TADs also recognized as mini-implants can accelerate the treatment in a number of cases.⁵ TAD or mini-implants momentarily fixed to bone for the principle of providing orthodontic anchorage by supporting the teeth, which is subsequently removed after use.⁶ Mini-implants produce skeletal anchorage and have been successfully proven in the treatment of cases with varying degrees of complications, if their placement is correctly positioned. Additional concern is to maintain oral hygiene around the TAD by the patient.^{7,8}

Currently, mini-implants have gained significant status as they provide greatest anchorage in conditions involving orthodontic movements that require maximum control.⁹ Considering the insertion sites, mini-implants can be fixed in the cortical region of the alveolar bone of mandibular molar; in the median or paramedian sagittal area of the maxillary hard palate; and in the zygomatic bone for orthodontic corrections.¹⁰ Height and anatomic structures of the bone determine the length, shape, and thickness of mini-implants.¹¹

Despite the scientifically advancement in mini-implant use, still there are some limitations of surgical risk with some patients that leads to an unwillingness in accepting these devices.¹² The present study was done to determine different experiences with mini-implants among pediatric patients.

Materials and Methods

This epidemiological study was done among patients undergoing orthodontic treatment in the Department of Pedodontics from April to December 2014 in Karad Institute of

Dental Sciences. Prior to the collection of data, ethical approval was obtained from the institute and informed consent was taken from all the participants or their guardians.

All the willing participants in whom mini-implants were fixed were included in the survey and participants with cleft lip and palate and with medical problems were excluded. A pre-tested survey was done among a 10 subjects in order to make sure the level of validity.

In this survey, all the participants or their guardians were interviewed with the help of a questionnaire containing information as experience during treatment with mini-implants, acceptance rate of mini-implants, tolerance, complications faced during procedure, and satisfactory results with the treatment.

Every subject was asked to complete a questionnaire with eight sections from 1 to 8 according to the severity of discomfort with visual analog scale (VAS). Discomfort level was noted at different intervals of time. The data were analyzed by SPSS 16.0 software. Nonparametric test was applied to obtain the median of VAS scores.

Results

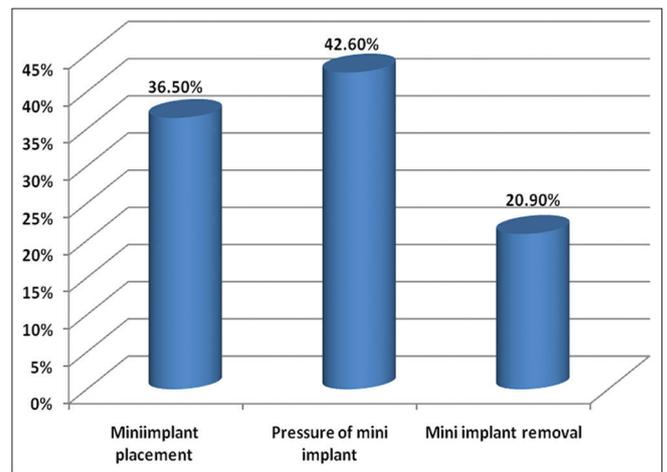
The total study sample was 86 whom mini-implant was fixed with orthodontic appliances. The participants were categorized as boys (41) and girls (45) with a mean age of 14±23 years. After fixing the mini-implant, most of the patients showed satisfactory results with time (86.4%).

In the present study, the most disagreeable feeling experienced was due to the pressure of mini-implants on the teeth surface (42.6%) followed by the time of insertion when the implant is placed in the bone (36.5%). Few subjects feel unpleasantness at the time of removal of the implant (20.9%) as shown in Graph 1.

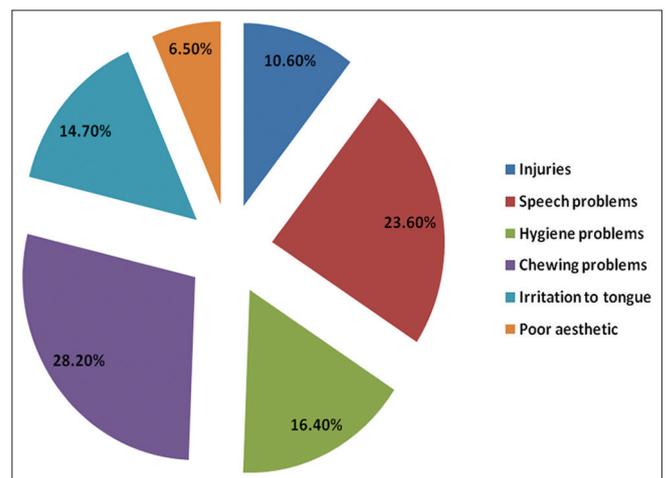
Graph 2 shows that most of the patients face problems with mini-implants during mastication of food (28.2%) and speech (23.6%). It also leads to poor oral hygiene in 16.4% of the subjects. It causes injuries in 10.6% of the participants. Less number of participants showed its relation to poor esthetics (6.5%).

The highest VAS scores were traced from the period of 1 h to 20 h, i.e. (33.7 to 40.2). After this time, the scores declined as 15.7 after 1 week, 8.2 after 2 week, and 2.3 after 1 month (Graph 3).

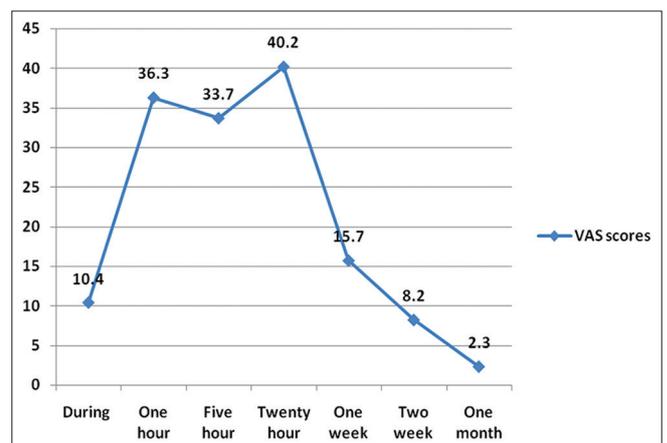
After the placement of mini-implant, the immediate effect noticed by the patients is the pressure on the tooth surface (31.3%) followed by pressure on mini-implants (26.5%). Some felt discomfort in the jaw bone (18.7%) and hard palate (14.6%) as mentioned in Graph 4.



Graph 1: Most disagreeable experience with mini-implants.

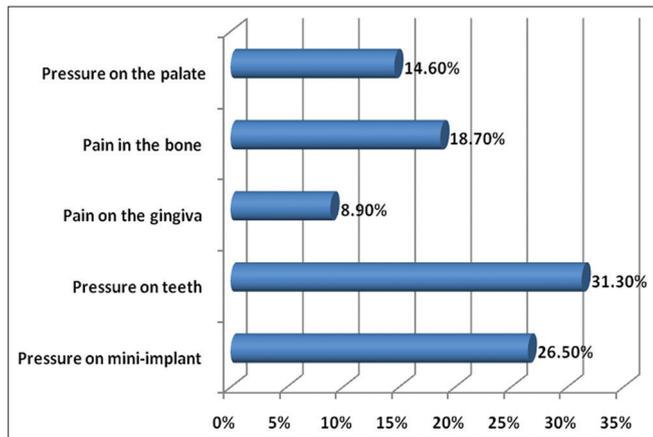


Graph 2: Complications faced by subjects with mini-implants.

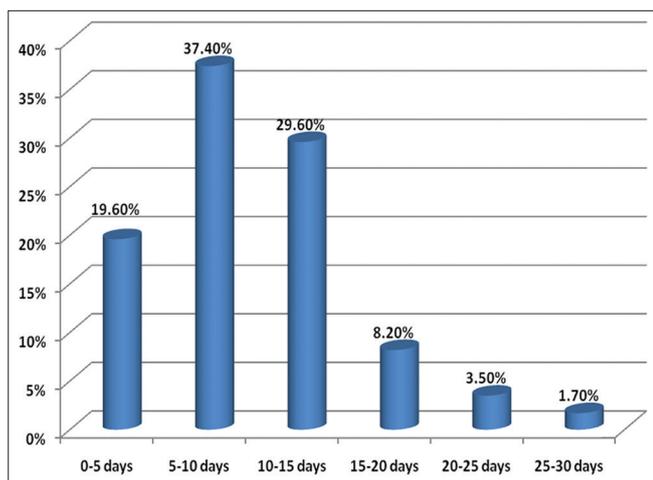


Graph 3: Visual analogue scale of pain after placement of mini-implants.

It was observed that most of the subjects get adapted to the mini-implants in 5-10 days, i.e. 37.4%, followed by 29.6% in 10-15 days. <20% get used within 5 days. Few participants showed the normal response with implants after 15 days as shown in Graph 5.



Graph 4: Effects of mini-implant placement on oral structures.



Graph 5: Response to the adoption of mini-implants.

Discussion

Anchorage is the resistance to unwanted movement of the tooth. The increased use of TADs (mini-implants) has developed to decrease the risks of patient compliance in the wish of providing supplementary outcomes.¹³ They also provide increased flexibility in supporting the tooth movements with conventional appliance mechanics.¹⁴

The level of pain after placement of the mini-implant was seen maximum from 1 to 20 h and the peak declined after 1 week. The result of the present study was similar with a study done by Kuroda *et al.*, 2007. This drop in pain level could be brought by the restraint of supporting soft tissues.¹⁵

Regarding the most disagreeable experience with mini-implants felt by patients was the pressure of implant followed by its placement. However, Bustamante *et al.* showed that numbness from the anesthetic was mentioned by 20%, pressure from mini-implant fixation by 40% and the too lengthy procedure was mentioned by 10% of patients. The fact behind the pressure of mini-implant is perfectly understandable, as it was a new procedure and unknown for the patients. It had been suggested by the orthodontist with the aim of facilitating the

orthodontic treatment. Even after consenting to the procedure, patients felt some psychological discomfort, even though no pain had been said.¹⁶

When the experience of mini-implants was observed, mastication and speaking problems were commonly seen in the participants. But, Bustamante *et al.* showed that the oral hygiene difficulties were mentioned by 40%, mastication difficulties by 10%, psychological pain by 10%. In spite of the huge contribution of these mini-implants, they pose complexities related to surgical procedures and discomfort level to the patients. Notwithstanding these barriers, patients should be informed in advance that surgical procedures are simple and are performed under local anesthetic. In addition, procedure efficiency is improved and time is shortened.¹⁷

The study showed that most of the patients adapted to these mini-implants for 5-15 days, as the pain subsides with time and structures supporting implant get stabilized with the implant. The time required to adapt mini-implants ranged from 5 to 15 days. Bustamante *et al.* in their study mentioned that patients required around 10 days to get used to implants. 60% were entirely adapted by 3rd day after surgery, whereas others required a longer duration of time.¹⁶⁻¹⁹

Conclusions

The study showed that most of the participants were satisfied with mini-implants as it accelerates the treatment. Mostly, discomfort level was noted by the pressure of mini-implant. Later on, it also leads to chewing, speaking, and hygiene problems. The peak level of pain was from 1 h to 1 day, and most of the subjects get used to the implants within 20 days. Mini-implants are unquestionably accessory tools for treatment of orthodontists and ought to be utilized in selected cases demanding greatest anchorage.

References

1. Costa A, Pasta G, Bergamaschi G. Intraoral hard and soft tissue depths for temporary anchorage devices. *Semin Orthod* 2005;11(1):10-5.
2. Jeon H, Lee SJ, Kim TW, Donatelli RE. Three-dimensional analysis of lip and perioral soft tissue changes after debonding of labial brackets. *Orthod Craniofac Res* 2013;16(2):65-74.
3. Gray JB, Smith R. Transitional implants for orthodontic anchorage. *J Clin Orthod* 2000;34(11):659-66.
4. Lee SJ, Jang SY, Chun YS, Lim WH. Three-dimensional analysis of tooth movement after intrusion of a supraerupted molar using a mini-implant with partial-fixed orthodontic appliances. *Angle Orthod* 2013;83(2):274-9.
5. Cho HJ. Clinical applications of mini-implants as orthodontic anchorage and the peri-implant tissue reaction upon loading. *J Calif Dent Assoc* 2006;34(10):813-20.
6. Chetan V, Jayade VP. Implants as absolute orthodontic anchors part 1. *JIOS* 2003;36:214-9.

7. Rossouw PE, Buschang PH. Temporary orthodontic anchorage devices for improving occlusion. *Orthod Craniofac Res* 2009;12(3):195-205.
8. Han JJ, Yang HJ, Lee SJ, Hwang SJ. Relapse after SSRO for mandibular setback movement in relation to the amount of mandibular setback and intraoperative clockwise rotation of the proximal segment. *J Craniomaxillofac Surg* 2014;42(6):811-5.
9. Yao CC, Lee JJ, Chen HY, Chang ZC, Chang HF, Chen YJ. Maxillary molar intrusion with fixed appliances and mini-implant anchorage studied in three dimensions. *Angle Orthod* 2005;75(5):754-60.
10. Kim TW, Kim H, Lee SJ. Correction of deep overbite and gummy smile by using a mini-implant with a segmented wire in a growing Class II Division 2 patient. *Am J Orthod Dentofacial Orthop* 2006;130(5):676-85.
11. Celenza F, Hochman MN. Absolute anchorage in orthodontics: direct and indirect implant-assisted modalities. *J Clin Orthod* 2000;34(7):397-402.
12. Gunduz E, Savio TT, Kocher G, Schneider B, Bantleon HP. Acceptance rate of palatal implants: a questionnaire study. *Am J Orthod Dentofacial Orthop* 2004;126(5):623-6.
13. Kravitz ND, Kusnoto B. Placement of mini-implants with topical anesthetic. *J Clin Orthod* 2006;40(10):602-4.
14. Bernhart T, Vollgruber A, Gahleitner A, Dörtbudak O, Haas R. Alternative to the median region of the palate for placement of an orthodontic implant. *Clin Oral Impl Res* 2000;11(6):595-601.
15. Kuroda S, Sugawara Y, Deguchi T, Kyung HM, Takano-Yamamoto T. Clinical use of miniscrew implants as orthodontic anchorage: Success rates and postoperative discomfort. *Am J Orthod Dentofacial Orthop* 2007;131(1):9-15.
16. Bustamante L, Brandão C, Mucha JN. Rate of mini-implant acceptance by patients undergoing orthodontic treatment – A preliminary study with questionnaires. *Dent Press J Orthod* 2008;118(5):118-27.
17. Thiruvengkatchari B, Pavithranand A, Rajasigamani K, Kyung HM. Comparison and measurement of the amount of anchorage loss of the molars with and without the use of implant anchorage during canine retraction. *Am J Orthod Dentofacial Orthop* 2006;129(4):551-4.
18. Dhiman S, Gaur A, Maheshwari S, Khan S. The relevance of physico-chemical and diagnostic properties of saliva during orthodontic treatment. *Int J Contemp Dent Med Rev* 2014;2014:Article ID: 011014, 2014. doi:10.15713/ins.ijcdmr.1.
19. Anil Kumar N, Agrawal G, Agrawal A, Sreedevi B, Kakkad A. Journey from 2-D to 3-D: Implant imaging a review. *Int J Contemp Dent Med Rev* 2014;2014:Article ID: 091114, 2014. doi: 10.15713/ins.ijcdmr.13.